UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte ROBERT MICHAEL ROBERTS, JONATHAN ANDREW GREEN, and SANCAI XIE

Appeal 2007-4137
Application 10/655,547
Technology Center 1600

Decided: November 8, 2007

Before TONI R. SCHEINER, DEMETRA J. MILLS, and ERIC B. GRIMES, *Administrative Patent Judges*.

MILLS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134. The Examiner has rejected the claims for lack of written description. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

Claim 182 is representative.

182. A method for detecting pregnancy in a bovine animal comprising:

(a) obtaining a sample from said animal; and

(b) detecting at least one pregnancy associated antigen (PAG) in the sample that is present early in pregnancy and is undetectable at about two months post-partum; whereby detection of the PAG indicates that the animal is pregnant.

Grounds of Rejection

Claims 182-196 stand rejected under 35 U.S.C. § 112, first paragraph for lack of written description.

DISCUSSION

Background

> Pregnancy diagnosis is an important component in sound reproductive management, particularly in the dairy industry … where a high proportion of artificial inseminations fail …. A reliable yet simple pregnancy test for cattle has long been sought. Several procedures are available, including a milk progesterone assay … estrone sulfate analysis …, rectal palpation …, ultrasound …, and blood tests for pregnancy-specific antigens. Of these, the progesterone milk assay is the most cost effective for the producer.… The presence of estrone sulfate in urine or serum provides another test but is only useful after day 100 as concentrations rise ….

(Specification 2-3.)

> The discovery of pregnancy-specific protein B (PSP-B) … provided a new approach to pregnancy diagnosis since it could be detected in the blood of pregnant cows by the fourth week of pregnancy …. Two other groups have developed immunoassays that may be based on an identical or immunologically similar antigen …. In one case, the antigen (Mr-67 kDa) was called bovine pregnancy-

> associated glycoprotein (boPAG; now boPAG-1) …; in the second, it was designated as pregnancy serum protein 60 (PSP60) …. The immunoassay for PSP-B/boPAGl/PSP60 has two advantages. First, it can detect pregnancy relatively early. Second, interpretation of the assays does not require knowledge of the exact date of service, since boPAG-1 immunoreactive molecules are always present in the maternal serum of pregnant cows by day 28, and concentrations increase as pregnancy advances.

(Specification 3.)

> There remain, however, two major disadvantages to this procedure. First, positive diagnosis in the fourth week of pregnancy remains somewhat uncertain because antigen concentrations in blood are low and somewhat variable. Second, boPAGl concentrations rise markedly at term … and, due to the long circulating half-life of the molecule …, the antigen can still be detected 80-100 day postpartum …, compromising pregnancy diagnosis in cows bred within the early postpartum period. Thus, the test can be carried out in dairy cows at day 30 only if artificial insemination ("AI") is performed at or after 70 day post-partum.

(Specification 3-4.)

> It is estimated that there are at least 100 PAG-related genes in cattle.

(Specification 23.)

Written Description

Claims 182-196 stand rejected under 35 U.S.C. § 112, first paragraph for lack of written description.

The Examiner contends that

> the specification does not describe all the PAGs required to practice the method of claim 182 in a manner that satisfies

> either the Lilly[1] or Enzo[2] standards. The specification does not provide the complete structure of any PAG, nor does the specification provide any physical or chemical characteristics of the other PAGs nor any *functional characteristics coupled with a known or disclosed correlation between structure and function* . . .

(Answer 5.)

The Examiner further argues that

> [t]he specification describes only a few PAGs where structural diversities exist among the different PAGs, ranging from 50% to 90% homology (See Figure 4 in both protein and nucleic acid identity comparison). With such diversity in terms of both amino acid and nucleic compositions among the few representatives (boPAG 1 to boPAG 12**),** one [of] ordinary skill in the art would not conclude that applicant sufficiently describe[s] a "representative number" of such species …. In addition, the specification also does not describe "structural features common to the members of the genus, which features constitute a substantial portion of the genus." …. It is noted that applicant describes some sequence identity around the catalytic aspartic acid residues (Asp 32 and Asp 215) among some BoPAGs, including boPAG 1-12 (See Figure 1). However, there is no further study correlating this region to the asserted function, i.e. present early in pregnancy and undetectable at about two months post-partum, using site-directed mutagenesis to ascertain the structural contribution to this functionality. Thus the specification does not provide an adequate written [description] by merely reciting the function limitations of the PAGs, such as detectable in early pregnancy and undetectable at 2-month post-partum.

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[1] *University of California v. Eli Lilly & Co.*, 119 F.3d 1559, 43 USPQ2d 1398 (Fed. Cir. 1997).

[2] *Enzo Biochem v. Gen-Probe Inc.*, 323 F.3d 956, 63 USPQ2d 1609 (Fed. Cir. 2002).

(Answer 5-6.)

Appellants, on the other hand, argue that the Examiner has

improperly blend[ed] the *separate* standards that permit satisfaction of the written description requirement. The Written Description Guidelines ("Guidelines") as recited in MPEP § 2163, which cite *Lilly* and *Enzo* in large part, state the following:

The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by

(1) actual reduction to practice,

(2) reduction to drawings, **or** by

(3) disclosure of relevant, identifying characteristics, i.e.,

(a) structure or other physical and/or chemical properties,

(b) by functional characteristics coupled with a known or disclosed correlation between function and structure, **or**

(c) by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus." *Id.* (emphases and indenting added). …. Thus, there are at least the three separate means identified in the Guidelines by which a disclosure may satisfy the written description requirement regarding a claimed genus, the third of which entails three further, ***separate*** options. That is, if a disclosure meets either of (a), (b) or a combination thereof according to (c) sufficient to show possession of a claimed genus, the written description requirement has been satisfied. More specifically concerning element (b), a showing of correlation between structure and function is only one means by which an applicant may satisfy the written description requirement.

(Reply Br. 3.)

"The 'written description' requirement [under 35 U.S.C. § 112, first paragraph] implements the principle that a patent must describe the technology that is sought to be patented; the requirement serves both to satisfy the inventor's obligation to disclose the technologic knowledge upon which the patent is based, and to demonstrate that the patentee was in possession of the invention that is claimed." *Capon v. Eshhar*, 418 F.3d 1349, 1357, 76 USPQ2d 1078, 1084 (Fed. Cir. 2005).

The written description must define the genus in a manner sufficient to enable one skilled in the art to "visualize or recognize the identity of the members of the genus," e.g., by providing a description of "structural features commonly possessed by members of the genus that distinguish them from others." *University of California v. Eli Lilly & Co.*, 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). We agree with the Examiner and find that the Specification does not provide an adequate description of the claimed invention nor does it define the genus such that one skilled in the art can "visualize or recognize the identity of the members of the genus," e.g., by providing a description of "structural features commonly possessed by members of the genus that distinguish them from others." *Lilly*, 119 F.3d at 1568, 43 USPQ2d at 1406.

In *Lilly*, the court held that claims generically reciting cDNA encoding vertebrate or mammalian insulin were not adequately described by the disclosure of cDNA encoding rat insulin. *Id.* at 1568, 43 USPQ2d at 1406. The court held that

> a generic statement such as "vertebrate insulin cDNA" or "mammalian insulin cDNA," without more, is not an adequate

> written description of the genus because it does not distinguish the claimed genus from others, except by function. It does not specifically define any of the genes that fall within its definition. It does not define any structural features commonly possessed by members of the genus that distinguish them from others. One skilled in the art therefore cannot, as one can do with a fully described genus, visualize or recognize the identity of the members of the genus.

Id. The court described two ways of properly describing a claimed genus:

> A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to the members of the genus, which features constitute a substantial portion of the genus.

Id. The court has since clarified that the description of representative species does not necessarily have to include their complete structure (nucleotide sequence). *See Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 964, 63 USPQ2d 1609, 1613 (Fed. Cir. 2002).

Nevertheless, the holding of *Lilly* supports the Examiner's conclusion that the instant Specification does not adequately describe the claimed genus of pregnancy associated antigen (PAG) that is present early in pregnancy and is undetectable at about two months post-partum used in the claimed method. The Specification does not describe any structural features that distinguish "early boPAGs" from boPAGs that are expressed late in pregancy or throughout pregnancy. The Specification states that the "data also show that the 'early' PAGs are relatively numerous and differ

considerably from each other and from boPAG1 in sequence" (Specification, p. 61, ll. 19-21).

Thus, the Specification does not describe the boPAGs detected in the claimed method adequately to enable one skilled in the art to "visualize or recognize the identity of the members of the genus." *Lilly*, 119 F.3d at 1568, 43 USPQ2d at 1406. Instead, the Specification informs those skilled in the art that a group of bovine proteins are expressed during pregnancy, that those expressed in a certain temporal manner are especially useful for detecting pregnancy, and that several specific proteins are expressed in the desired manner. But the claims are not limited only to those specific boPAGs that are disclosed to be expressed in the desired manner; the claims also encompass using any other boPAG that is found to be expressed in the desired manner as a pregnancy marker. The Specification does not show possession of the group of boPAGs having the desired expression pattern.

In particular, *Lilly* states that "[a] definition by function … does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is…. It is only a definition of a useful result rather than a definition of what achieves that result." *Lilly* at 1568, 43 USPQ2d at 1406. Appellants have claimed a method of detecting a pregnancy associated antigen (PAG) that has been defined by its function, i.e., that it is present early in pregnancy and is undetectable at about two months post-partum, contrary to *Lilly*.

Appellants argue that the Specification provides the complete structure of at least seven boPAGs within the scope of the claims and that

the described species are representative of the claimed genus (Appeal Br. 3-5, 7-8).

We disagree. As discussed above, the evidence shows that some boPAGs were known in the prior art, and the Specification provides the complete structure of several boPAGs. The Specification's disclosure, combined with the knowledge in the art, may well constitute an adequate description of boPAGs generically. That, however, is not the issue presented here. The issue is whether the Specification adequately describes the subset of boPAGs that are expressed early in pregnancy but not detectable two months post-partum. Appellants have pointed to no structural features shared by the disclosed "early boPAGs" that distinguish them from boPAGs that are expressed at different times during pregnancy.

An adequate written description is one that allows those skilled in the art to distinguish compounds within the scope of the claims from those outside the claims. Here, that description would be one that allows a skilled artisan to determine, based on structure, whether a new, uncharacterized boPAG would be expressed early in pregnancy and not detectable two months post partum. Appellants have pointed to no description that would allow those skilled in the art to make such a determination.

Appellants argue, however, that those skilled in the art can follow the methods taught in the Specification to identify and "isolate additional, novel PAGs that are present early in pregnancy and are undetectable at about two months post-partum" (Appeal. Br. 8; Reply Br. 7). But an adequate written description requires more than a description of methods for identifying such

compounds; it requires a description of the compounds used in the claimed method themselves.

For example, in *University of Rochester v. G.D. Searle & Co., Inc.*, 358 F.3d 916, 69 USPQ2d 1886 (Fed. Cir. 2004), the subject patent claimed a method of selectively inhibiting the enzyme PGHS-2 (also known as COX-2) by "administering a non-steroidal compound that selectively inhibits activity of the PGHS-2 gene product in a human." *Id.* at 918, 69 USPQ2d at 1888. The patent "described in detail how to make cells that express either COX-1 or COX-2, but not both . . . , as well as 'assays for screening compounds, including peptides, polynucleotides, and small organic molecules to identify those that inhibit the expression or activity of the PGHS-2 gene product.[']" *Id.* at 927, 69 USPQ2d at 1895.

The court held that the disclosure of screening assays and general classes of compounds was not adequate to describe compounds having the desired activity: without disclosure of *which* peptides, polynucleotides, or small organic molecules have the desired characteristic, the claims failed to meet the description requirement of § 112. *See id.* ("As pointed out by the district court, the '850 patent does not disclose just 'which "peptides, polynucleotides, and small organic molecules" have the desired characteristic of selectively inhibiting PGHS-2.'. . . Without such disclosure, the claimed methods cannot be said to have been described.").

It is true that this case differs from *Rochester* in that the patent in *Rochester* did not disclose any compounds having the properties recited in the claims, while the Specification here apparently describes seven "early" boPAGs. However, the test for adequate description still requires

description of the compounds within the genus in a manner that shows possession of the genus to those skilled in the art.

Whether a description is adequate to show possession, and thereby satisfy the written description requirement, depends on "a variety of factors, such as the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue." *Capon*, 418 F.3d at 1085. The evidence in this case shows that it is entirely unpredictable whether a given boPAG is expressed early in pregnancy and undetectable two months post-partum. The Specification provides no description that allows those skilled in the art to distinguish boPAGs having those properties from others, except by empirically testing each boPAG individually.

In short, the evidence does not show that Appellants were in actual or constructive possession of the genus of boPAGs that are expressed early in pregnancy but undetectable two months post-partum. Rather, it shows that they were in possession of several boPAGs with those characteristics, and hoped that others might also be shown to have those characteristics but could provide no description of the hoped-for additional species that would direct those skilled in the art to which ones they would be. The Specification does not adequately describe the boPAGs recited in the claims, and the assays disclosed do not make up for the deficiency of the Specification's description.

Appellants also argue that there is a high level of conservation among the seven "early" PAGs that have been reduced to practice, as illustrated by the sequence alignments and the consensus sequences provided in Figure 1,

and in the phylogenic tree provided in Figure 5 of the Specification. (Appeal Br. 7). In addition, Appellants argue that the claimed genus "is limited by what PAGs are produced by a bovine animal, . . . thus dictat[ing] a finite and limited class of PAGs" (*id.* at 8), which "share *both structural and functional* characteristics" (*id.*).

However, Appellants have not explained how the level of conservation among PAGs in general, or their shared structure and function, would allow those skilled in the art to distinguish "early" boPAGs from other boPAGs, except by empirically testing each boPAG individually.

In view of the above, the written description rejection is affirmed.

Other Issue for Consideration

If this application is subject to further prosecution, it is recommended that the Examiner review the claims of U.S. Patent No. 6,869,770 directed to a Composition and Method for Early Pregnancy Diagnosis, to determine whether a rejection of any of the instant claims for obviousness-type double patenting is warranted.

SUMMARY

The rejection of claims 182-196 under 35 U.S.C. § 112, first paragraph for lack of written description is affirmed.

AFFIRMED

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